WHITE PAPER

LOUISIANA EMERGENCY RESPONSE NETWORK
Right Place. Right Time. Right Care.

October 2013

Building a Stroke System in Louisiana

Purpose

U.S. Centers for Disease Control and Prevention ranks Louisiana as the ninth highest state for stroke deaths (2009). Stroke is the fourth highest killer of Louisiana residents.[1] Stroke affects an estimated 700,000 people each year in the U.S. Approximately 80% of strokes are ischemic and the remaining 20% are hemorrhagic. Approximately 80% of these patients survive, however many are burdened with major disabilities.[2] Today in the U.S. the optimal care settings to address incidents of stroke are Advanced Comprehensive and Primary Stroke Centers certified by The Joint Commission, the organization responsible for maintaining national standards for health care organizations and programs. Joint Commission certification is recognized nationwide as a symbol of quality that reflects an organization's commitment to meeting certain performance standards.[3]

Currently, Louisiana does not have a system of care to comprehensively treat incidents of stroke and only two Advanced Comprehensive Stroke Centers and eight Advanced Primary Stroke Centers exist, all of which are geographically mal-distributed within the State's borders. The Louisiana Emergency Response Network (LERN) is utilizing a framework of best practices and lessons learned from other states to promote and facilitate the development of an ideal stroke system of care.

This paper provides and explains the framework.

Introduction

LERN is an agency of state government, created by the Louisiana Legislature in 2004 and charged with the responsibility of developing and maintaining a statewide system of care coordination for patients suddenly stricken by serious traumatic injury or time-sensitive illness.

Funding for the establishment of LERN operations began in July 2006. Since, the LERN Board of Directors (hereafter referred to as "the board") has established nine regional commissions populated with stakeholder volunteers that live and work within the region they represent. Recognizing the lack of access to stroke treatment across the state, LERN formed a work group of subject matter experts and invested community leaders from throughout the state to head the Louisiana Stroke Initiative in an effort to develop a system that could provide high level stroke care to all Louisiana residents.

Per Louisiana legislation RS 40:2845, the board has the duty to work with the Louisiana Department of Health and Hospitals to develop a stroke system that is designed to promote rapid identification of and access to appropriate stroke resources statewide. For the board to fulfill this duty, an effective plan for public education plus an integration plan for pre-hospital (EMS) and hospital processes must be developed. LERN will utilize the following framework to build the ideal stroke system of care in Louisiana.

I. Access to Definitive Care

Whenever a stroke occurs, the time between the onset of symptoms and access to definitive care is critical. The term "window of opportunity" is often used to describe the first three hours after the onset of symptoms. Stroke patients receiving definitive care within this three-hour "window" have an increased chance of independence. Tissue plasminogen activator (tPA) is a life-saving drug and the only FDA approved intervention approved for the treatment of an occlusive stroke within the first few hours. It is frequently used in the incident of ischemic stroke to reduce clotting and must be administered within the first few hours of onset to be effective.[4]

Multiple published studies indicate a decrease in patient mortality for patients treated in designated stroke centers, including a Duke University study of more than 30,000 patients treated in the New York hospital system. The study found that admission to a designated stroke center was associated with a 2.5 percent absolute reduction in 30-day all-cause mortality. The study further states that admission to a designated stroke center was associated with increased use of thrombolytic (tPA) therapy by 2.2 percent.[5]

Access to definitive care no longer means the delivery of a patient directly to a Comprehensive or Primary Stroke Center. Using the "hub and spoke" model, where a hub Comprehensive or Primary Stroke Center links to spoke hospitals via telemedicine, all patients can receive life-saving access to care and treatment with tPA. In fact, a study published by the American Heart Association, Telemedic Pilot Project for Integrative Stroke Care (TEMPiS), concluded patients treated with tPA by spoke hospitals produced virtually the same outcomes as hub hospitals.[6] In addition, the randomized STRokE DOC trial in the United States showed that hospitals with access to telemedicine for stroke care resulted in more accurate diagnosis and less variation from protocols.[7]

Due to these studies, LERN is promoting a system of transporting stroke patients to tPA capable centers, but because Louisiana only has two Comprehensive Stroke Centers and eight Primary Stroke Centers, five of which are

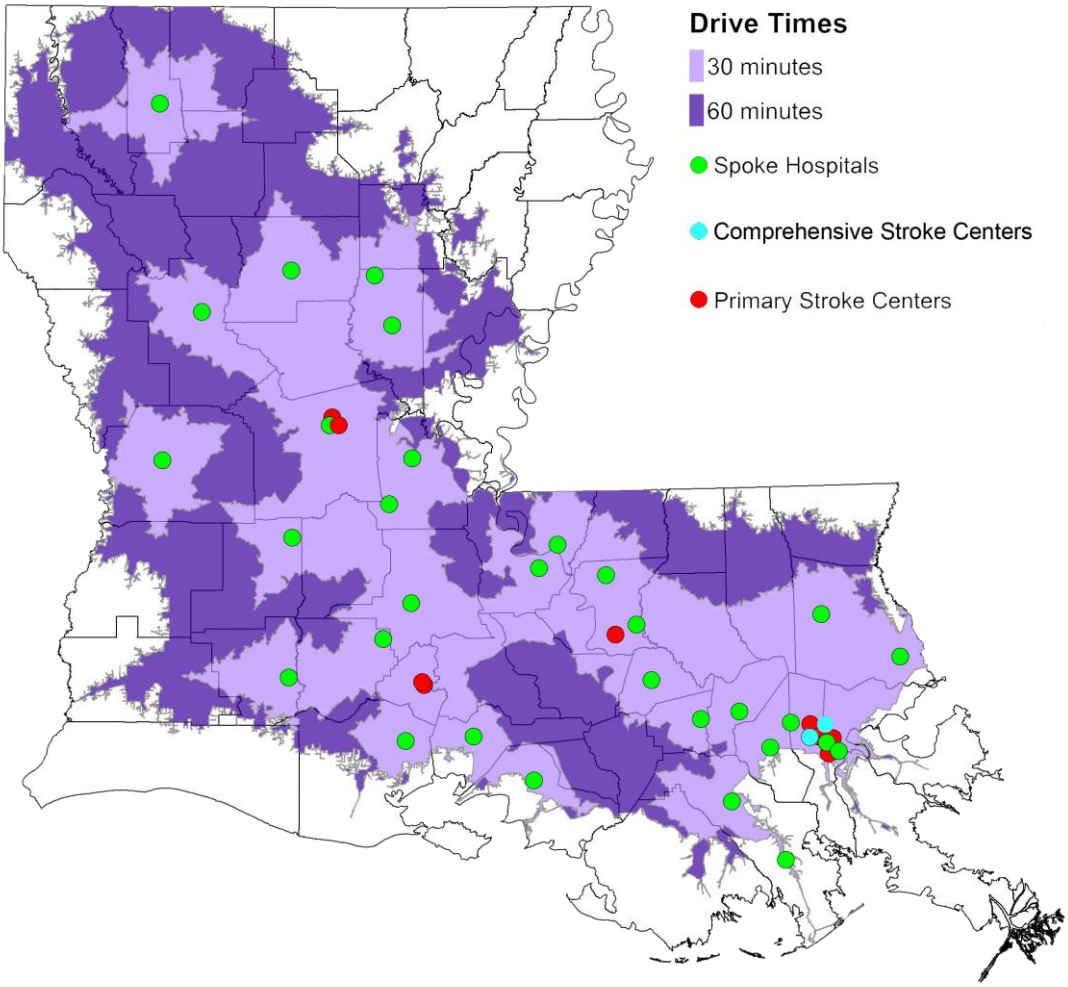
located in Greater New Orleans Area, Region 1, access to timely care is still very much limited.

Figure 1 provides a general picture of the coverage areas available through Louisiana's two existing Comprehensive Stroke Centers and eight Primary Stroke Centers and (tele-stroke) spoke hospitals.

To capitalize on the decreased rate of mortality seen in patients receiving care in a timely fashion, Louisiana must continue to build a system of designated stroke centers and tele-stroke enabled hospitals that can provide all Louisiana residents with access to definitive care. To aid in designation and classification, LERN will use nationally recognized criteria for participating hospitals to distinguish stroke treatment hospitals by their capabilities – LERN Level I, II, III, or IV – establishing treatment and transfer guidelines for each level.

While adequate treatment facilities are an imperative, they are only one piece of the stroke system of care. Professionals, both pre-hospital (EMS) and emergency department

Figure 1 – Drive Times to Comprehensive and Primary Stroke Care and Tele-Stroke Spoke Hospitals



staff, must be trained to recognize the signs of stoke and utilize guidelines for treatment. LERN has conducted state stakeholder meetings and continues to support the development of programming to ensure proper identification of stoke symptoms and utilization of guidelines for patient delivery and treatment.

II. Patient Volume and Care

Health care quality research has produced an extensive amount of literature that documents superior patient outcomes for hospitals and physicians with higher patient volumes. This literature suggests that substantial reductions in mortality rate can be achieved through regionalized treatment models for certain high-risk conditions, including stroke.[8] In fact, according to a recent study published by the *Journal of NeuroInterventional Surgery*, higher volume endovascular stroke centers have faster times to treatment, higher reperfusion rates, and higher rates of good clinical outcomes.[9]

The Joint Commission acknowledges this greater rate of effectiveness among high volume hospitals in its *Comprehensive Stroke Center Certification Requirements* and calls for a diagnosis of at least 20 patients with subarachnoid hemorrhage and 15 endovascular coiling or surgical clipping procedures performed for aneurysms per year and for the administration of tPA to 25 patients per year on average, including administration through telemedicine and transferred patients.[10] Hospitals in Louisiana seeking LERN Level I stroke center designation must achieve The Joint Commission's Comprehensive Stroke Center certification.

Low volume centers are a reality across the state and in rural locales. Understanding this, LERN established patient care guidelines for the four levels of LERN stroke center designation to balance the best care possible with available resources. The full list of requirements for each LERN level is included in Section IV. Resources.

III. Population Density and Rate of Stroke

Currently only two Comprehensive Stroke Center exists both located in New Orleans and the eight existing Primary Stroke Centers are mal-distributed – located in New Orleans, Lafayette, Baton Rouge, and Alexandria only. Densely populated areas in Louisiana without direct access to Primary Stroke Centers include Lake Charles, Shreveport, Monroe, and Covington/ Northshore. While some of these areas do have access to tele-stroke enabled hospitals, the ideal network would be comprised of hubs of Comprehensive and/or Primary Stroke Centers (LERN Level I and Level II) in every densely populated area with access to tele-stroke enabled spoke hospitals (LERN Level III) in rural areas.

Development of additional Comprehensive and Primary Stroke Centers, along with LERN Level III centers, will aid in providing greater access to care throughout the state. Notoriously underserved, rural populations that are tele-stroke enabled or participate in transfer guidelines will no longer be hindered by a lack of resources such as an on-staff neurologist or stroke expert.[11]

Figure 2 is a Louisiana population density map with an overlay of current Primary Stroke Centers and window of opportunity coverage of the centers and their tele-stroke networks. **Figure 3** depicts the rates of stroke mortality and current coverage of Primary Stroke Centers and the reach of their telestroke networks. Together these figures show that many high population and high stroke mortality areas are not within window of opportunity coverage.

Figure 2 – Louisiana Population Density Map with Window of Opportunity Overlay

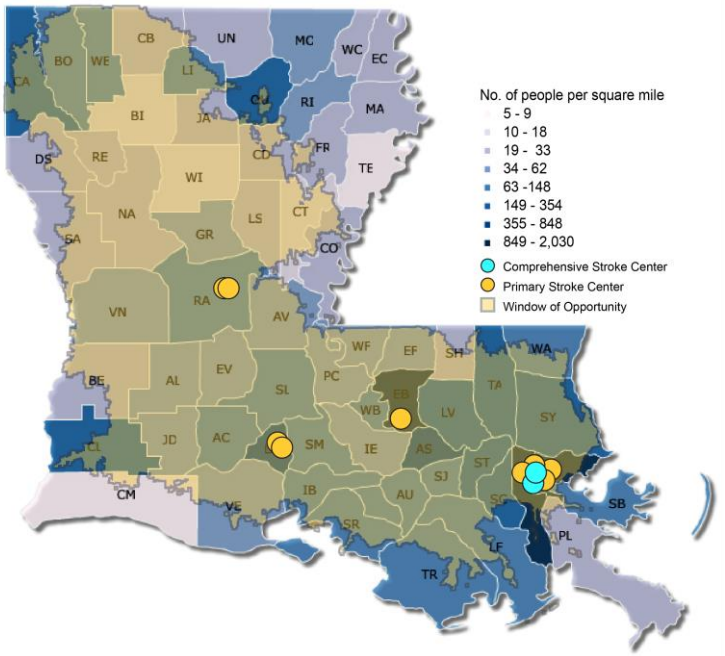
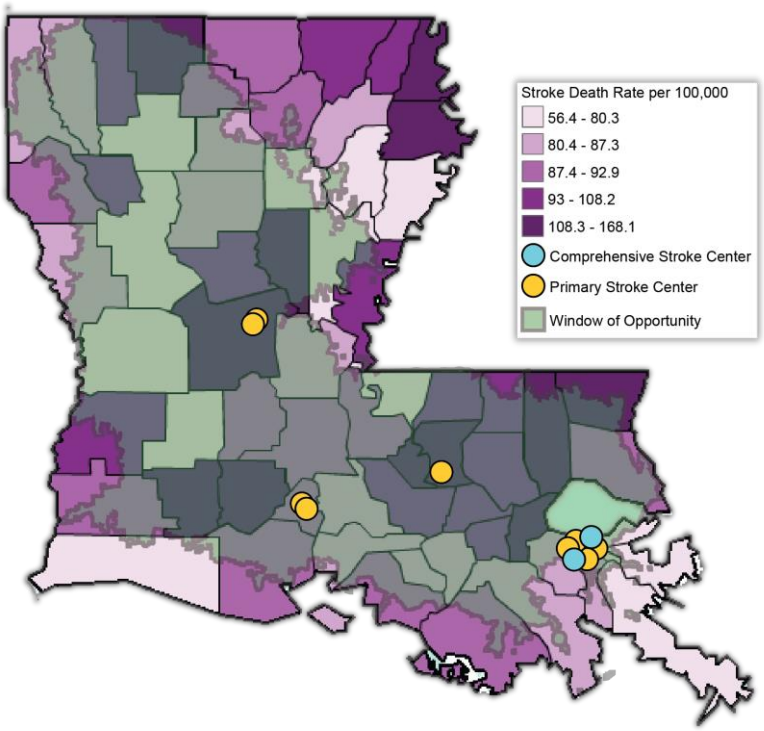


Figure 3 – Louisiana Stroke Mortality Rate with Window of Opportunity Overlay



IV. Resources

Comprehensive and Primary Stoke Centers (LERN Level I and Level II, respectively) require the availability of a stroke unit, CT-scanners, laboratory, the ability to administer tPA, and the use of guidelines and quality control mechanisms. Comprehensive Stroke Centers must be willing to commit to 30-minute coverage for vascular neurology and neurosurgery and Primary Stroke Centers must commit to 30-minute coverage for neurological expertise and two-hour coverage for neurosurgery. Level III centers do not require neurosurgery support.

Table 1 illustrates all required criteria for each LERN Stroke center designation.

In a recent survey conducted by the LERN stroke work group, only seven of 71 hospitals indicated a vascular neurologist on staff. LERN recognizes the scarcity of vascular neurologists and neurosurgeons and the challenge it presents to the development of an ideal stroke system of care. Availability and willingness of neurologists to support a designated stroke center is a critical factor that impacts the ongoing viability of existing centers and the spoke hospitals they support, and the establishment of new Comprehensive and Primary Stroke Centers. Thus, LERN's established criteria is designed to build upon the hub and spoke model to make the most of available resources, ensuring all hospitals are stroke ready and have adequate measures in place to treat stroke patients in-house or at other hospitals.

Table 1 – LERN Stroke Center Criteria

Criteria	LERN Level IV	LERN Level III	LERN Level II (Primary Stroke Center)	LERN Level I (Comprehensive Stroke Center)
Physician staffed ER 24/7	X	X	X	X
CT scan available <12h	X			
CT scan available 24/7		X	X	X
Lab < 45 minutes		X	X	X
Proficient tPA delivery		X	X	X
Neurological expertise <15 min		X	X	X
Vascular neurology <30 min				X
Neurosurgery <2 h			X	
Neurosurgery <30 min				X
Interventional				X
Research				X
Training programs				X
Stroke unit			X	X
ICU			X	X
NICU				X
Quality control		CMS required core measures for stroke	CMS required core measures for stroke/ Joint Commission	CMS required core measures for stroke/ Joint Commission
Guidelines for stroke		X	X	X

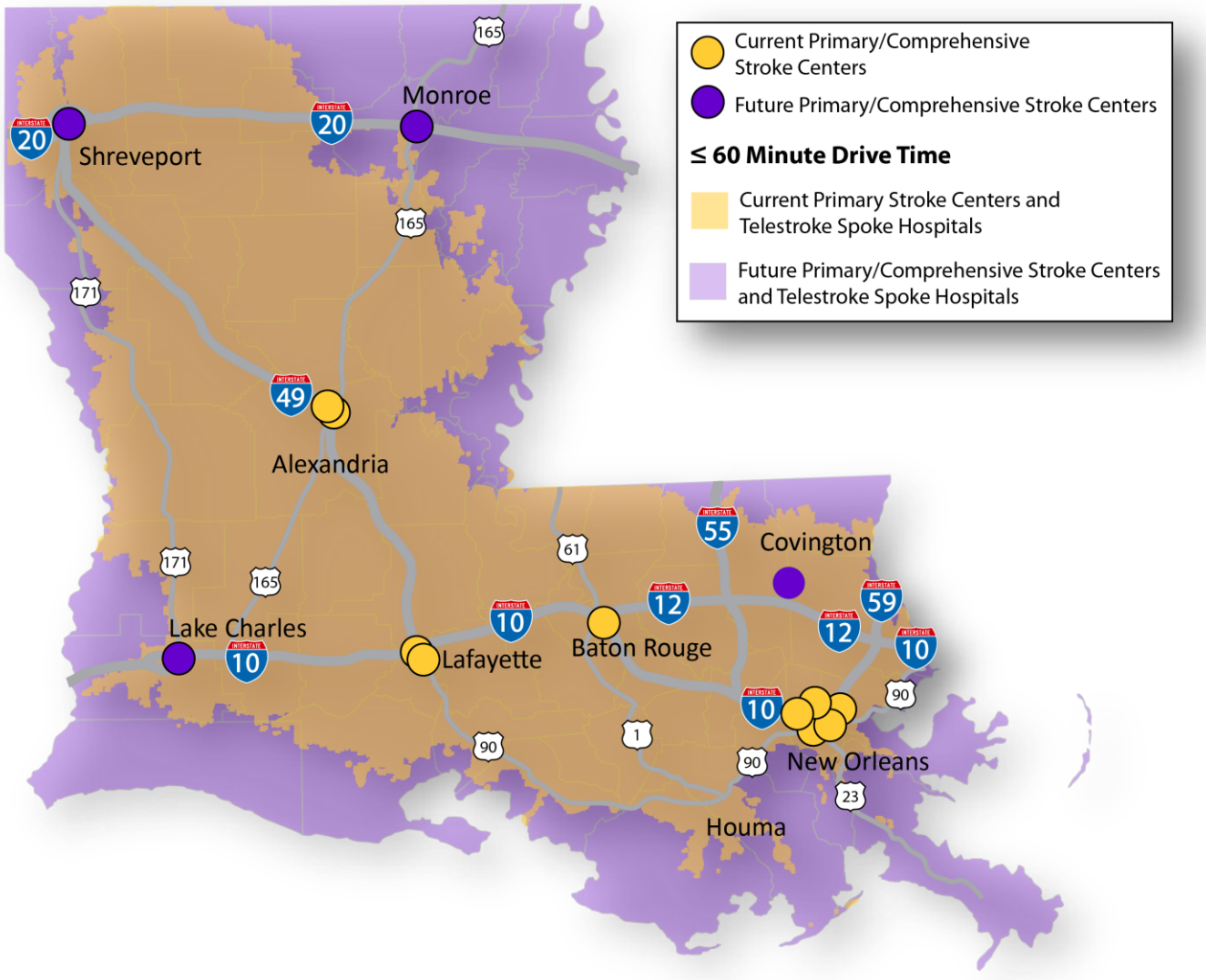
V. Conclusion

Louisiana's two Comprehensive and eight Primary Stroke Centers and their spoke hospitals are not adequate to provide window of opportunity access to care for all Louisiana residents. Significant geographic holes in Louisiana's stroke care network exist, leaving many of our citizens at risk.

LERN is therefore working with the Department of Health and Hospitals to develop a stroke system to ensure adequate coverage in densely populated areas and further expand spoke hospital access that fill geographic holes in the stroke system of care, promoting the rapid identification of and access to appropriate stroke resources statewide. **Figure 4** depicts that future.

LERN's goal is to meet the stroke care needs of all Louisiana residents while using available resources in the most efficient manner possible.

Figure 4 – Proposed Stroke Center Map with Window of Opportunity Overlay



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